

# Opportunities and Challenge in Building Vibrant Urban Street Based on Urban Vitality Theory

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**Abstract:** *The Urban Vitality Theory and its connection to urban street design are investigated. The Urban Vitality Theory highlights how the planning of small blocks and mixed-use developments can enhance street utilization. Case studies of 'Woonerf' and 'Complete Street' are analyzed to reveal the theory's positive impact. The study identifies a promising design approach for Liverpool's neighborhoods, aiming to create walkable communities with lively streets. However, is a protracted process to transform the automobile-oriented lifestyle and urban structure, necessitating the collaborative efforts of the government and citizens. These efforts are crucial for bolstering social vitality and fostering a sustainable future.*

**Keywords:** *urban vitality theory, vibrant urban street, shared street, walkable community*

## 1. Introduction

Street occupied 80% of public space in urban area<sup>[1]</sup>. It is the framework shaping the structure of a city. The main function of streets is to connect different areas and provide accessibility in the city. Researchers found that, compare to the scattered parks, people always spend more time on streets for passage, physical activities, and leisure<sup>[2]</sup>. The contemporary street design not only focuses on its function of passage, but also explores the possibility of being a pedestrian-based space with diverse users and modes. In 1961, Jane Jacobs proposed Urban Vitality Theory, which advocates for exploring more possibilities for community life and enhancing social cohesion<sup>[3]</sup>. Urban planning should maintain the characteristics of a community as well as explore more possibilities<sup>[3]</sup>. Jacobs criticized the rationalism in urban planning led by Le Corbusier, Ebenezer Howard, and Frank Lloyd Wright<sup>[4]</sup>. She believed that rationalism simplify and even ignore the complexity of urban life in different community<sup>[3]</sup>. Urban planning should base on fully observe and reconcile to the city, rather than replacing existing lifestyles with theoretical plans and abstract design images<sup>[4]</sup>. These findings had a significant impact on the advocacy planning movement, and the New Urbanism theory and practice<sup>[5]</sup>. In order to preserve the "vitality" of city, Jacobs emphasised the value of walking activities.

This article will discuss the relationship between Urban Vitality Theory and urban street planning, the characters of walkable and vibrant street, and compare two different types of walkable street. Finally, this article will explore the possibility of applying Urban Vitality Theory in Liverpool.

## 2. Theoretical Basis

Jacobs highlighted four requirements for a vibrant urban community: primary mixed use, small neighbourhood blocks, buildings with various ages and identities, and the requirement for high density buildings<sup>[3]</sup>. As a space for all, streets played an important role in shaping the structure and identity of a community. It related to the requirement of 'primary mixed use' and 'small neighbourhood blocks' in Urban Vitality Theory.

'Primary mixed use' requires diversity in community activities and functions. At certain times of the day, the primary function draw residents to the area, while the secondary function makes the community lively at other times<sup>[3]</sup>. The mixed use of land at the street level provides local residents with various retail options and diversity of activities. At the district level, it has a positive impact on promoting regional characteristics and cultural diversity. At city level, various pillar industries have been attracted and formed, enriching the urban structure and social layers, increasing the sustainability of urban

development<sup>[3]</sup>.

'Small neighborhood blocks' discusses the relationship between block size and community vitality. Smaller blocks mean a reduction in street length and an increase in intersections. Jacobs believes that large blocks hinder permeability between streets, while small blocks and shorter streets increase flexibility of access. Planning short streets allow users reach the destination faster and make the community more active. In addition, the increase in the number of intersections limit the speed of car traffic effectively, improve the safety and comfort of walking<sup>[3]</sup>.

The requirement of 'primary mixed use' and 'small neighborhood blocks' provide theoretical basis for community structure and street planning. For streets, multiple components and flexible planning are positive in improving functionality and efficiency of use, thus, increase community vitality.

### 3. Walkable Street and Walkable Community

Based on the Urban Vitality Theory, streets play an important role in promoting vibrant lifestyle in the community. Thus, the planning and design of street is the focus of practicing Jacobs' theory. In 2005, both Southworth and Alfonzo proposed the framework of street design. To attract the utilisation and increase community vitality, a street should be safety, with good quality, and have good connectivity<sup>[6]</sup>.

Safety of street includes two aspects: crime on street and traffic safe. Jacobs believed that everyone is the regulator of the street<sup>[3]</sup>. When the street is mix-used, the numbers of users will increase. Every user becomes a regulator. The increase of 'eyes on the street' restrict criminals effectively, whether the regulators are pedestrians, shoppers, diners, or residents living upstairs<sup>[3]</sup>. However, scholars discuss that Jacobs' viewpoint is based on observation without data or experimental evidence<sup>[7]</sup>. A study shows a negative correlation between the number of bystanders and the possibility of intervening in criminal behavior<sup>[8]</sup>. Another study suggests that residents perceive mixed commercial streets have more strangers, which is less secure than residential streets<sup>[9]</sup>. Therefore, improving street lighting functions and increasing community cohesion are also crucial in enhancing sense of security<sup>[9]</sup>.

Traffic safe plays an important role in shaping walkable community. Research found that cities with wider roads and higher proportion of large block often have higher traffic mortality rates<sup>[10]</sup>. Reduce the car speed and separate pedestrian and vehicle are required in street planning. Jacobs' concept of 'small neighborhood blocks' reduce the length of street and increase the number of intersections<sup>[3]</sup>. It is benefit in reducing car speed. The design of street and neighbourhood should around pedestrian rather than around car. To separate pedestrian and car lane, it requires to improve the quality of street, consider street greenbelt, and plan wide walkway<sup>[6]</sup>.

Street quality influence the wellness of using the street<sup>[6,11]</sup>. A wide pedestrian walkway separated from the vehicle lane provides a sense of safety. Good vegetation coverage and functional street furniture improve comfort and support multiple activities happen. Mixed use is important in creating a vitality street. Streets with bioretention systems benefit to the stormwater management in community<sup>[12]</sup>. Streets with high vegetation coverage helps with urban heat mitigation<sup>[13]</sup>. Streets dominated by pedestrians and containing activity spaces promote social communication through vibrant street life<sup>[14]</sup>.

To improve the connection of street, small block size is required. Jacobs believed that small blocks in neighbourhood create more intersection and shorter street<sup>[3]</sup>. It increases the flexibility of block connection and improves the convenience and efficiency of walking. When the community has higher density of the intersection and street, walking to stores will be popular due to shorter routes and higher efficiency<sup>[15]</sup>. When population density and street connections are higher, children are more likely to walk to school<sup>[16]</sup>.

Safety, good quality, and good connection provide a framework of walkable street. Based on these characters, streets will attract users and active social life. Future urban landscape planning should focus more on the mixed use street, and design around pedestrian.

### 4. Practice of Theory --- 'Woonerf' and 'Complete Street'

Based on the framework of walkable street and Urban Vitality Theory, several movements and concepts emerged such as 'complete street' and 'woonerf'. These concepts play an important role in shaping walkable community and vibrant street life.

The concept of 'Woonerf' appeared in the Netherlands in the 1960s, advocating the street design for

mixed use of motor vehicles and pedestrians. Initially, residents spontaneously set up planting pots or benches on the streets, to bend the street and limiting vehicle speeds<sup>[17]</sup>. ‘Woonerf Street has the following characteristics: Firstly, the street surface is continuous, with little gap between the carriageway and the walkway. Secondly, it is not recommended for vehicles to travel through. Vehicle speeds and flows are limited through physical barriers such as planting zones, parking spots, plazas, etc. Lastly, the driveway should not be placed close to the building’s entrance. Buffer zone should be present nearby<sup>[14]</sup>.

The concept of ‘complete street’ emphasised the safety and inclusivity of the streets. It was originally intended to protect the rights of bicycles on the road, advocating for safe and well-designed bicycle lanes. With the development of the concept, it includes a guarantee for the use of streets by vulnerable groups (elderly, children, disabled)<sup>[18]</sup>. Nowadays, the ‘complete street’ is gradually developing towards mixed-use, including create a safe street space that accommodates various activities, and environment friendly ‘green complete street’<sup>[18]</sup>.

Case studies using the concepts of ‘woonerf’ and ‘complete street’ will be selected. Based on the urban vitality theory, the next section will analyse how streets help with shaping walkable and vibrant communities.

#### 4.1. Context and general information

Both Linden Living Alley and Lancaster Boulevard locate in California, USA. Linden Living Alley is a practice of ‘Woonerf’, Lancaster Boulevard follows the concept of ‘complete street’ (Figure 1)).

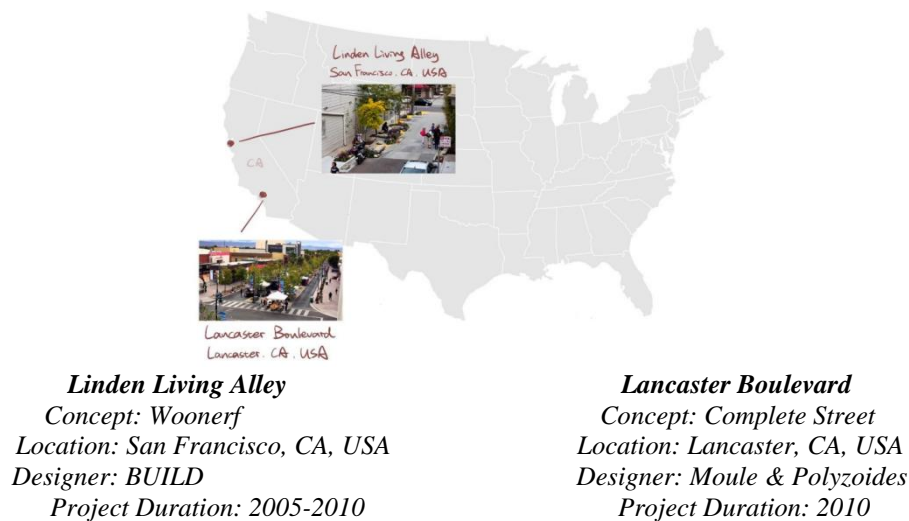


Figure 1: Context location of case studies.

#### 4.2. Comparison between previous and now (Figure 2 - 5)

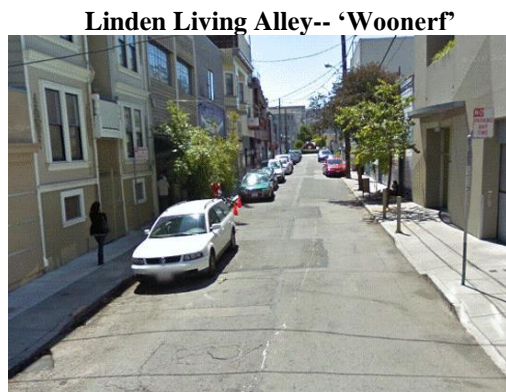


Image from: Google Map Street View, 2003



Image from: John Massengale, 2007

Figure 2: Linden St. before, with single use of alley

Figure 3: Lancaster Blvd. before, domain by car



Image from: BUILD, 2010      Image from: City of Lancaster, 2011

Figure 4: Linden St. after, more social activities. (Left)

Figure 5: Lancaster Blvd. after, less car lane and more space for activities with street trees. (Right)

Previously, Linden Street separated the car lane and narrow walkway. It used to be a place for drug usage, prostitution, and other crimes<sup>[19]</sup>. The redesign of Linden Street derived by citizens<sup>[20]</sup>. The street is transformed from an unpopular back street prone to crime to an outdoor communication space with landscape.

Lancaster Boulevard used to be a main traffic. The high car speed and poor infrastructure for pedestrian reduce the economic vitality and social identity<sup>[21]</sup>. The redesign of Lancaster Boulevard reduced the dominance of cars, widened pedestrian way, and added plaza and public space. Now the place has become a popular shopping and gathering place.

#### 4.3. Comparison of street scale (Figure 6-9)

##### Linden Living Alley-- ‘Woonerf’

##### Lancaster Boulevard-- ‘complete street’



Image and data from: Google Earth

Image and data from: Google Earth

Figure 6: Linden St. scale & surrounded land use. (Left)

Figure 7: Lancaster Blvd. scale & surrounded land use. (Right)

The scale of Linden Living Alley is small. It is located in residential area. There is a café on the street, which is the key to promoting residents to use the street for communication. The scale of Lancaster Boulevard is much larger than Linden Living Alley, with commercial area on both sides.

Both of these two projects reflect the mixed use of land. The mixed commercial use in residential areas is the main reason driving residents to use streets. Design multiple functional space and landscape elements based on the surrounding land use is helpful in increasing street utilisation, promoting social and physical activity, and enhancing urban vitality.





Image from: David Winslow, 2006

Figure 8: Linden St. Blue Bottle Coffee.



Image from: Curt Gideon, 2009

Figure 9: Lancaster Blvd. market

#### 4.4. Comparison of street structure

##### Linden Living Alley -- 'Woonerf'

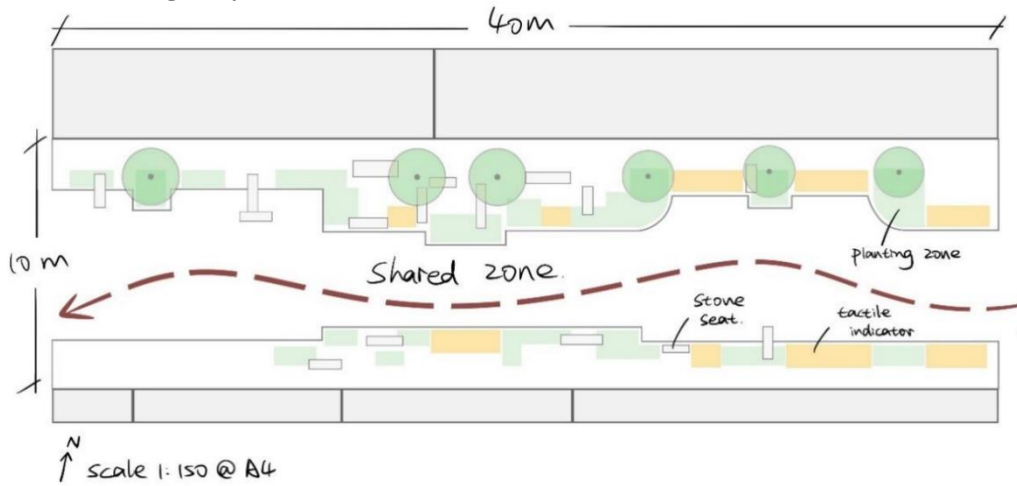


Figure 10: Linden Living Alley plan<sup>[22]</sup>

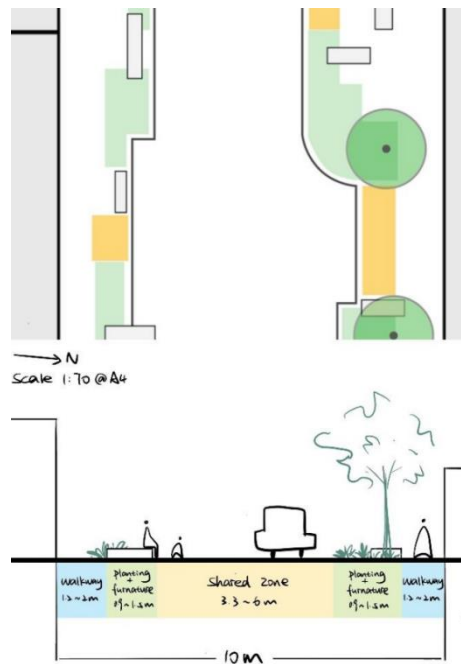


Figure 11: Linden Living Alley section<sup>[22]</sup>

Linden Living Alley is 40 meters long and 10 meters wide. Traffic flow is controlled due to narrow streets (Figure 10). The street is in a curve shape formed by planting zone and street furniture. These structure support residents' activities on the street and reduce car speed when passing shared zone. All these structures create an inclusive, walkable, and vitality street (Figure 11). Most vehicles slow down when entering alley, but a few drivers may show impatience. The conflict between car and pedestrian is a risk. Thus, government support and wider promotion of the concept of shared streets are crucial.

### Lancaster Boulevard -- 'complete street'

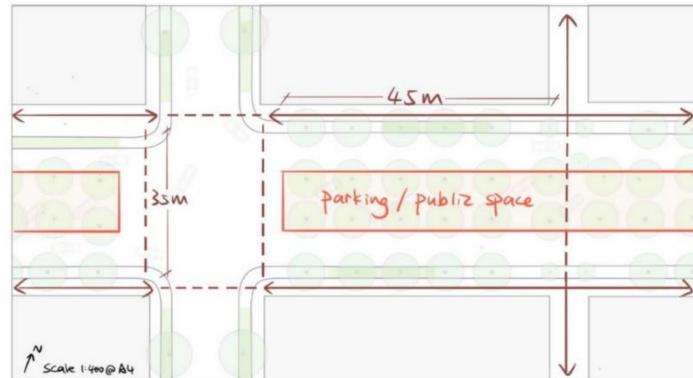


Figure 12: Lancaster Boulevard plan<sup>[21]</sup>

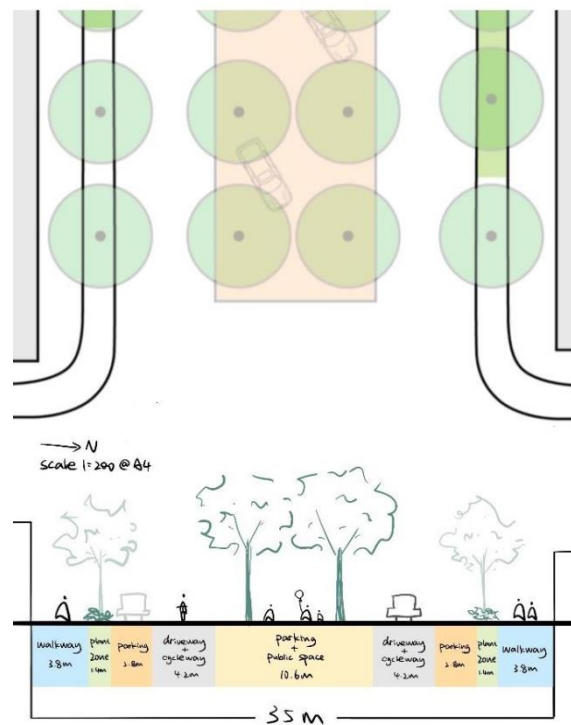


Figure 13: Lancaster Boulevard section<sup>[21]</sup>

Lancaster Boulevard is 35 meters wide, with walkway and car lane on two side, and parking and public space in the middle (Figure 12). The length of the blocks on both sides of the road is about 100 meters. In order to increase the connectivity between surrounding streets, the pathway is setup for pedestrian only in the middle of the block. Therefore, in Lancaster Boulevard, the density of intersection is high, with an average of one intersection every 50 meters (Figure 13).

Compare with Lancaster Boulevard, 'Woonerf' works better in narrow street in neighbourhood due to the lower demand on heavy traffic. Narrow streets are more helpful in promoting communication, activities, and limit traffic flow. However, 'complete street' works better in larger street, which can accommodate the requirement of well-designed walkway and cycleway, water sensitive design, street greening, and multifunction public spaces. Similarly, the mixed use of commerce, residential, and public

open spaces increase street usage willingness and enhance neighbourhood vitality.

‘Woonerf’ and ‘complete street’ also help with economic growth and social progressive. Between 2008 and 2011, employment along West Lancaster Avenue increased by 64% and retail sales surged by 96%<sup>[23]</sup>. Due to the new street structure and traffic pattern, the overall number of traffic collisions on Lancaster Avenue reduce nearly a half, while collisions involving injuries have decreased by 85%<sup>[21]</sup>. Due to the increase in ‘eyes on the street’, criminal behaviour in Linden Alley has significantly decreased. The number of pedestrians and cyclists has increased, and the time people spend on the streets has increased<sup>[20]</sup>.

The concept of ‘Woonerf’ and ‘Complete Street’ play an important role in shape walkable community, promote traffic safe, and increase social communication. The street deign in Liverpool can follow these concepts, become an inclusive, vitality, and cohesive neighbourhood.

## 5. Critical Reflection --- Streets in Future Liverpool --- 400

Liverpool located in the southwest of Sydney. It is a suburb with diverse culture groups (figure 14). In order to promote communication between different culture groups and reduce racial segregation, the planning of public spaces and streets is crucial. Streets in multicultural societies are also places where people from different ethnic backgrounds find opportunities for interaction<sup>[24]</sup>. Therefore, in Liverpool, urban street planning has a demand and development potential in creating vibrant communities and promoting active transportation.

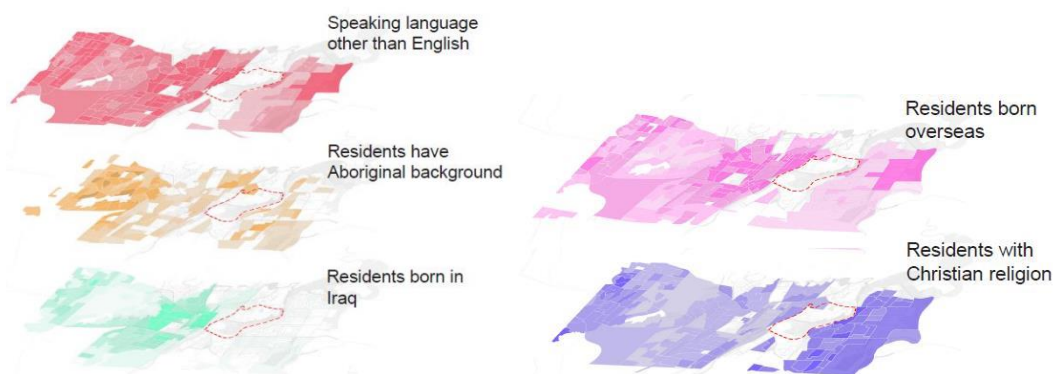
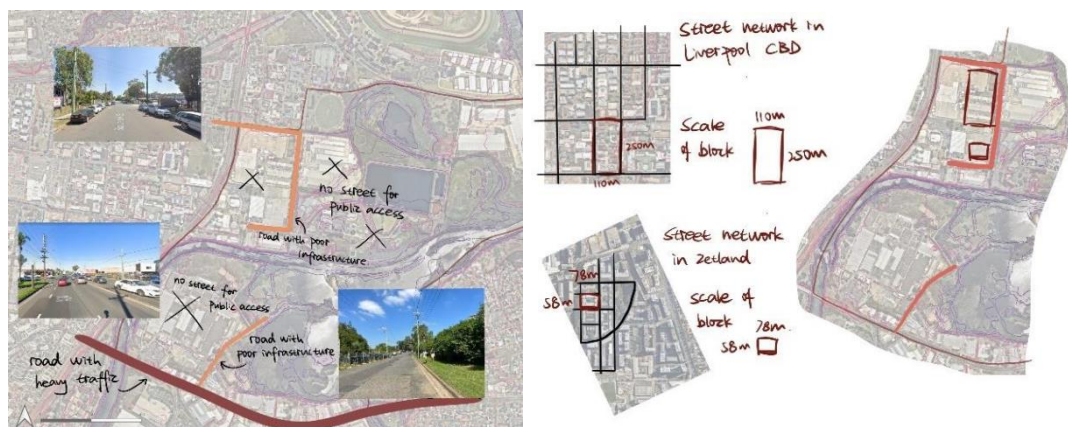


Image From: Group Jasmine, LAND 2411 Studio 8 Phase 2 Data from: Liverpool City Council (2023). Demographic Statistic. Available at: <https://atlas.id.com.au/liverpool/maps/population-density>

Figure 14: The composition of Liverpool's demographic and cultural background.

The existing land use in study area are mostly industrial factory and warehouse. There are only three roads connect to study area with poor street design (figure 15). There is a great potential to design new streets around pedestrian, plan walkable community.



Images take by author and from google street view.

Figure 15: Existing street conditions in study area.

Figure 16: Block size comparison.

To create a vitality neighbourhood, small block size and primary mixed use are required. Figure 16 compares the scale of block in Liverpool CBD and Zetland. The block in Liverpool includes low rise house and townhouse. The scale of this type of block is large. The perimeter block in Zetland includes mid-rise to high rise apartment. Through the scale comparison, the perimeter block is benefit to the flexible street network. Based on the research, the future scenario of Liverpool is to become a pedestrian dominated neighbourhood, with strong culture identity and various of street life. The concept of ‘Woonerf’ and ‘Complete Street’ can be practiced in Liverpool.

- Develop active transport, encourage walking, cycling, and public transport.
- Transform the wide road into ‘Complete Street’ with safe walkway and cycle lane, public open space, and green and blue infrastructure.
- Build small block type, increase the connection of street.
- Design ‘Woonerf’ neighbourhood street, limit car use, improve social communication, and increase the safety of street.
- Mixed use apartment with commercial function along the street, attract resident to use the street and enhance community vitality.

## 6. Conclusion

In conclusion, this article reviews the Urban Vitality Theory, and analyse the relationship between urban vitality and street design. Planning small blocks and primary mixed-use attract the utilisation of street. The case study analysis of ‘Woonerf’ and ‘Complete Street’ demonstrated the positive role of Urban Vitality Theory. It finds a potential design direction for future Liverpool neighbourhood. In the future, Liverpool will be a walkable neighbourhood with vibrant street life. Transforming the car domain lifestyle and urban structure is a long-term process. The promotion of walkable communities requires the efforts of the government and citizens, to enhance the vitality of society and achieve sustainable future.

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